

| REPORT DOCUMENTATION PAGE   |                             |                              |                            | Form Approved<br>OMB No. 0704-0188       |   |
|---|-----------------------------|------------------------------|----------------------------|--|---|
| Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.  |                             |                              |                            |  |   |
| 1. REPORT DATE (DD-MM-YYYY)<br>23-04-2008   |                             | 2. REPORT TYPE<br>FINAL      |                            | 3. DATES COVERED (From - To)             |   |
| 4. TITLE AND SUBTITLE<br><br>Insurgency Season: The link between the Intertropical Convergence Zone and Insurgencies in Equatorial Africa   |                             |                              |                            | 5a. CONTRACT NUMBER                      |   |
|   |                             |                              |                            | 5b. GRANT NUMBER                         |   |
|   |                             |                              |                            | 5c. PROGRAM ELEMENT NUMBER               |   |
| 6. AUTHOR(S)<br><br>Christopher L. Gabriel<br><br>Paper Advisor (if Any): Jeffrey Barker  |                             |                              |                            | 5d. PROJECT NUMBER                       |   |
|   |                             |                              |                            | 5e. TASK NUMBER                          |   |
|   |                             |                              |                            | 5f. WORK UNIT NUMBER                     |   |
| 7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)<br><br>Joint Military Operations Department<br>Naval War College<br>686 Cushing Road<br>Newport, RI 02841-1207   |                             |                              |                            | 8. PERFORMING ORGANIZATION REPORT NUMBER |   |
| 9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)   |                             |                              |                            | 10. SPONSOR/MONITOR'S ACRONYM(S)         |   |
|   |                             |                              |                            | 11. SPONSOR/MONITOR'S REPORT NUMBER(S)   |   |
| 12. DISTRIBUTION / AVAILABILITY STATEMENT<br>For Example: Distribution Statement A: Approved for public release; Distribution is unlimited.   |                             |                              |                            |  |   |
| 13. SUPPLEMENTARY NOTES A paper submitted to the Naval War College faculty in partial satisfaction of the requirements of the Joint Military Operations Department. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.   |                             |                              |                            |  |   |
| 14. ABSTRACT<br><br>The impact of climatology on an insurgency has received little attention, particularly in the Equatorial region of Africa, where the seasonal north-south shift of the Intertropical Convergence Zone (ITCZ) creates distinct wet and dry seasons throughout the region. During the wet season, widespread flooding and inclement weather dominate, severely impacting ground mobility and air operations, and severely restricting a government's ability to attack insurgents. During the dry season, the skies are generally clear and ground mobility is good, making counter-insurgency operations feasible. An evaluation of insurgencies that occurred from 1979-2007 in Equatorial Africa, coupled with climatological data of the position of the ITCZ, shows that a definite correlation exists between the relative intensity of conflict within an insurgency and the seasonal shift in the ITCZ. When the ITCZ dominated the region, insurgencies tended to be relatively quiescent. As the ITCZ shifted south, insurgencies had a tendency to intensify. Also linked to this correlation is the historical record of U.S. military deployments to the region in response to the intensified fighting within the insurgencies. The repeating pattern is one of heavy insurgent fighting during the latter half of the dry season (March through May), which in turn precipitates a crisis which the U.S. military is then tasked to respond to. The linkage between the ITCZ and the intensity of an insurgency, in light of the historical pattern of U.S. military deployments to Equatorial Africa, can be used by military planners as a planning tool to better allocate forces and schedule exercises within the AFRICOM theater, such that the U.S. military is poised and prepared to respond to any crisis in the region. |                             |                              |                            |  |   |
| 15. SUBJECT TERMS<br>Intertropical Convergence Zone, climatology, insurgency, Equatorial Africa   |                             |                              |                            |  |   |
| 16. SECURITY CLASSIFICATION OF:   |                             |                              | 17. LIMITATION OF ABSTRACT | 18. NUMBER OF PAGES<br><br>39            | 19a. NAME OF RESPONSIBLE PERSON<br>Chairman, JMO Dept     |
| a. REPORT<br>UNCLASSIFIED   | b. ABSTRACT<br>UNCLASSIFIED | c. THIS PAGE<br>UNCLASSIFIED |                            |  | 19b. TELEPHONE NUMBER (include area code)<br>401-841-3556 |

**NAVAL WAR COLLEGE  
Newport, R.I.**

**INSURGENCY SEASON:**  
**The link between the Intertropical Convergence Zone and insurgencies in Equatorial**  
**Africa**

**by**

**Christopher L. Gabriel**

**LCDR, USN**

**A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.**

**The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.**

**Signature: \_\_\_\_\_**

**23 April 2008**

## **Abstract**

### *Insurgency Season: the link between the Intertropical Convergence Zone and insurgencies in Equatorial Africa*

The impact of climatology on an insurgency has received little attention, particularly in the Equatorial region of Africa, where the seasonal north-south shift of the Intertropical Convergence Zone (ITCZ) creates distinct wet and dry seasons throughout the region. During the wet season, widespread flooding and inclement weather dominate, severely impacting ground mobility and air operations, and severely restricting a government's ability to attack insurgents. During the dry season, the skies are generally clear and ground mobility is good, making counter-insurgency operations feasible. An evaluation of insurgencies that occurred from 1979-2007 in Equatorial Africa, coupled with climatological data of the position of the ITCZ, shows that a definite correlation exists between the relative intensity of conflict within an insurgency and the seasonal shift in the ITCZ. When the ITCZ dominated the region, insurgencies tended to be relatively quiescent. As the ITCZ shifted south, insurgencies had a tendency to intensify. Also linked to this correlation is the historical record of U.S. military deployments to the region in response to the intensified fighting within the insurgencies. The repeating pattern is one of heavy insurgent fighting during the latter half of the dry season (March through May), which in turn precipitates a crisis which the U.S. military is then tasked to respond to. The linkage between the ITCZ and the intensity of an insurgency, in light of the historical pattern of U.S. military deployments to Equatorial Africa, can be used by military planners as a planning tool to better allocate forces and schedule exercises within the AFRICOM theater, such that the U.S. military is poised and prepared to respond to any crisis in the region.

## Table of Contents

|   |    |
|---|----|
| I. Introduction                                     | 1  |
| II. Discussion / Analysis                           | 4  |
| The Intertropical Convergence Zone (ITCZ) in Africa | 4  |
| The Effect of the ITCZ on Insurgencies              | 5  |
| Case Example Comparisons                            | 8  |
| U.S. Responses to Crises in Africa (1979-2006)      | 12 |
| III. Analytical Conclusions                         | 13 |
| IV. Recommendations                                 | 14 |
| V. Final Remarks                                    | 16 |
| Bibliography  | 18 |
| Appendices  | 20 |

## **List of Illustrations**

| <b>Figure</b> | <b>Title</b>  | <b>Page</b> |
|---------------|---|-------------|
| 1.            | Equatorial Africa   | 3           |
| 2.            | January Position of the ITCZ  | 6           |
| 3.            | July Position of the ITCZ   | 6           |
| Appendix A    | Comparison diagram for the Ugandan Civil War (1981-1986)  | 20          |
| Appendix B    | Comparison diagram for the Second Sudanese Civil War (1983-2003)  | 21          |
| Appendix C    | Comparison diagram for the Holy Spirit Movement / Lord's Resistance Army insurgency in Uganda (1987-2005) | 24          |
| Appendix D    | Comparison diagram for the First Liberian Civil War (1989-1996)   | 27          |
| Appendix E    | Comparison diagram for the Rwandan Civil War (1990-1994)  | 29          |
| Appendix F    | Comparison diagram for the Sierra Leonean Civil War (1991-2000)   | 30          |
| Appendix G    | Comparison diagram for the First Congo War (1996-1997)  | 32          |
| Appendix H    | Comparison diagram for the Guinea-Bissau Civil War (1998-1999)  | 33          |
| Appendix I    | Comparison diagram for the Second Liberian Civil War (1999-2003)  | 34          |
| Appendix J    | Comparison diagram for the Cote d'Ivoire Civil War (2002-2007)  | 35          |

## **I. Introduction**

The chronic instability that has plagued post-colonial Africa has produced an extensive history of military interventions by a variety of non-African nations and organizations, in both combat and humanitarian roles. Not only have the former colonial powers of France, Great Britain, and Belgium intervened in various crises, but both the United Nations and African Union have played (and will continue to play) a significant role in establishing and maintaining peace and assisting in humanitarian efforts. Similarly, the United States has had an active role in the stability of the African continent, and seeks even greater security and stability with its formation of U.S. Africa Command (AFRICOM).

While much has been written about the political and social factors behind instability in Africa, one factor that has received scant attention, particularly in the Equatorial region of Africa, is that of the influence of the Intertropical Convergence Zone (ITCZ), its seasonal shift, and its effect on the intensity of conflict in an insurgency. The focus of this study is to determine if a correlation can be established between the relative intensity of conflict within an insurgency and the seasonal shift in the ITCZ. The heavy and continuous rains associated with the ITCZ produce widespread flooding and make roads impassable; in addition, low ceilings, poor visibility, thick cloud layers, and moderate to heavy thunderstorms can greatly impact air operations. However, when the ITCZ shifts to the south, the region begins to dry out and the skies clear. Roads and rivers become passable and air operations become possible. Thus it makes sense that these impacts on air and ground mobility also extend into the realm of counter-insurgency operations (COIN).

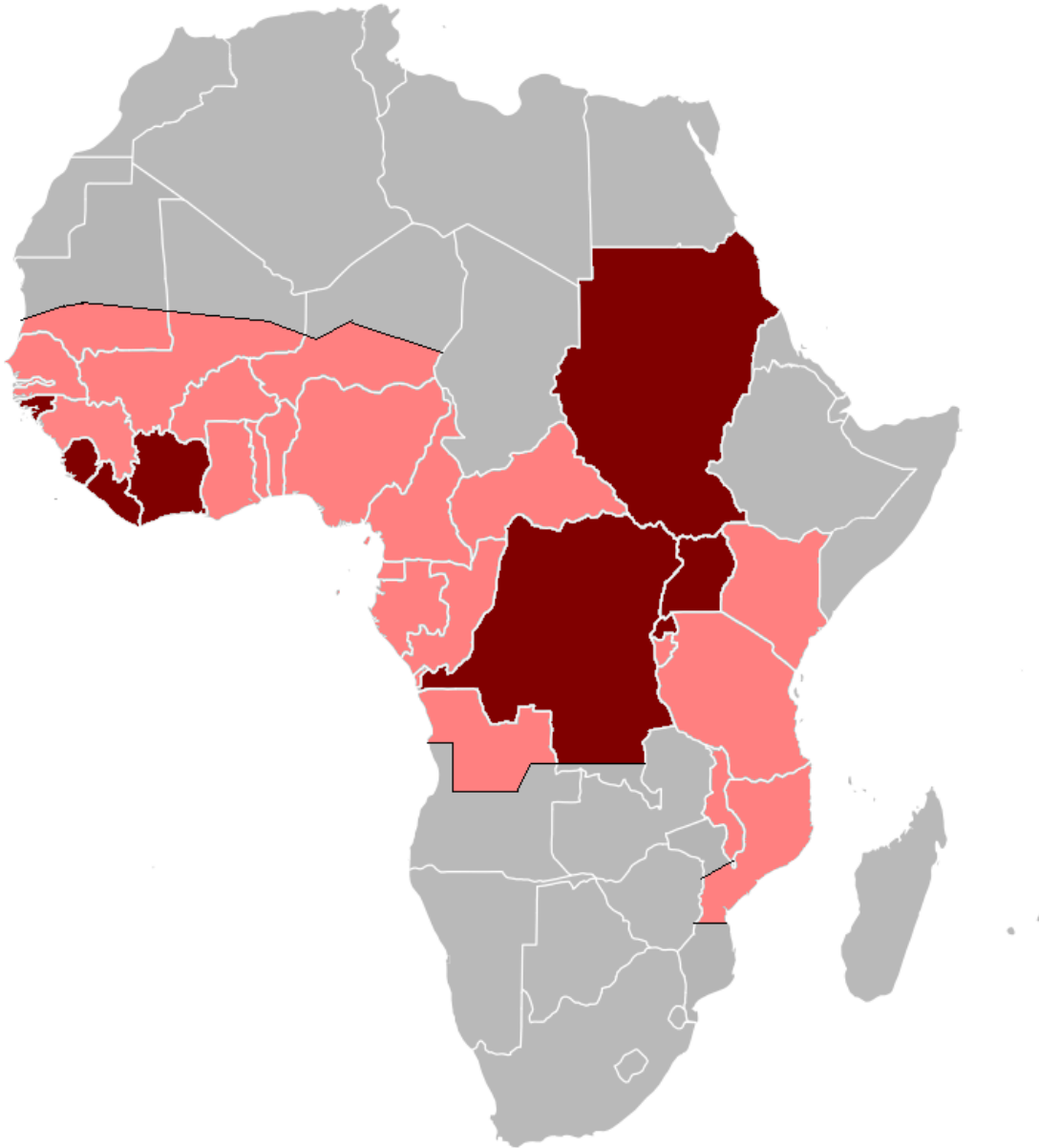
A more thorough understanding of this correlation between the seasonal shift of the ITCZ and the intensity of conflict in an insurgency could serve as an important contributing factor for

operational planners within the U.S. military, particularly those at AFRICOM charged with preparing for humanitarian assistance / disaster relief (HA/DR), COIN, non-combatant evacuation operations (NEO), or stability and security operations (SO/SO). More importantly, this linkage could be exploited such that the U.S. could better anticipate flare-ups in ongoing crises within Equatorial Africa (see figure 1), providing the U.S. with additional time with which to prepare operations and bring forces to bear – proactive planning, vice reactionary planning.

In order to establish this correlation, the timelines of past insurgencies in Equatorial Africa will be compared to climatological data, in order to determine if the most intense periods of the insurgency occurred during the wet season (ITCZ in its northern position) or during the dry season (ITCZ in its southern position). The climatological data was obtained from the National Oceanographic and Atmospheric Administration (NOAA) and covers the years from 1979 to 2007. The more difficult task has been assembling detailed chronologies of the insurgencies used in this study, in order to determine when increases in the intensity of an insurgency occurred. Comprehensive histories of these insurgencies do not exist; thus the timelines have been assembled from a variety of sources. The following insurgencies were used in this study:

- Ugandan Civil War (1981-1986)
- Second Sudanese Civil War (1983-2003)
- Holy Spirit Movement / Lord's Resistance Army insurgency (1986-2007)
- First Liberian Civil War (1989-1996)
- Rwandan Civil War (1990-1994)
- First Congo War (1996-1997)
- Sierra Leone Civil War (1991-2002)
- Guinea-Bissau Civil War (1998-1999)
- Second Liberian Civil War (1999-2003)
- Cote d'Ivoire Civil War (2002-2007)

A comparison of the location of the ITCZ to periods of intense conflict will show that, when the ITCZ was present, conflict was minimal, yet when the ITCZ shifted south, intensity of



**Figure 1.** Equatorial Africa, as defined by Donahue, et al, 1995, shaded in pink. Countries with insurgencies used in this study are colored crimson. Sudan, while not traditionally considered in Equatorial Africa, is used in this study and is thus colored crimson.

conflict increased. A historical review of U.S. responses to crises in Africa will then be compared to the ITCZ data, to determine if the responses to crises in Equatorial Africa are linked to the correlation between the ITCZ and the intensity of the insurgencies. If so, then the U.S.



could potentially modify its allocation of forces and be better prepared for “Insurgency Season” and the potential U.S. missions that might result (NEO, COIN, HA/DR, SO/SO).

## **II. Discussion / Analysis**

### **THE INTERTROPICAL CONVERGENCE ZONE (ITCZ) IN AFRICA**

The Intertropical Convergence Zone (ITCZ) in Africa is a semi-permanent climatological feature that is caused by the convergence at the surface of the earth of air flowing from two semi-permanent centers of high pressure: the Azores High, and the South Atlantic High. The Azores High is in the northern hemisphere and is located near the Azores Islands in the mid-North Atlantic Ocean. The South Atlantic High is in the southern hemisphere and is typically located several hundred miles off the west coast of Namibia/South Africa. Between these two high pressure systems a low-level, east-west oriented trough is formed, with dry, subtropical Saharan air north of the trough, and moist, equatorial Atlantic air south of the trough. The convergence of these two masses of air at the surface of the earth causes the air to move upwards into the atmosphere. This vertical movement cools the air and produces a widespread band of moderate to heavy precipitation immediately south of the trough. This band can be anywhere from 550-800 miles wide.<sup>1</sup>

The shifting nature of the ITCZ is largely based on the relative strengths of the Azores and South Atlantic Highs. The Azores High moves south of the Azores Islands and begins to strengthen in October-November. This movement, coupled with the development of the associated Saharan High over Libya, pushes the ITCZ southward. At the same time, the South Atlantic High weakens, allowing the ITCZ to move further south. By December-January, the ITCZ is at its most southerly location, stretching from Cote d’Ivoire, central Nigeria, central

---

<sup>1</sup> Donahue, *Equatorial Africa*, 2-9 to 2-18.

Cameroon, northern Democratic Republic of Congo, southwest Tanzania, and eastern Zambia (see figure 2). In April-May, the South Atlantic High begins to strengthen, pushing the ITCZ northward. At the same time, the Saharan High disappears and the Azores High weakens and moves northward, facilitating the northward migration of the ITCZ. By July the ITCZ has reached its most northerly location, stretching over central Mauritania, northern Mali, northern Niger, central Chad, and central Sudan (figure 3).<sup>2</sup>

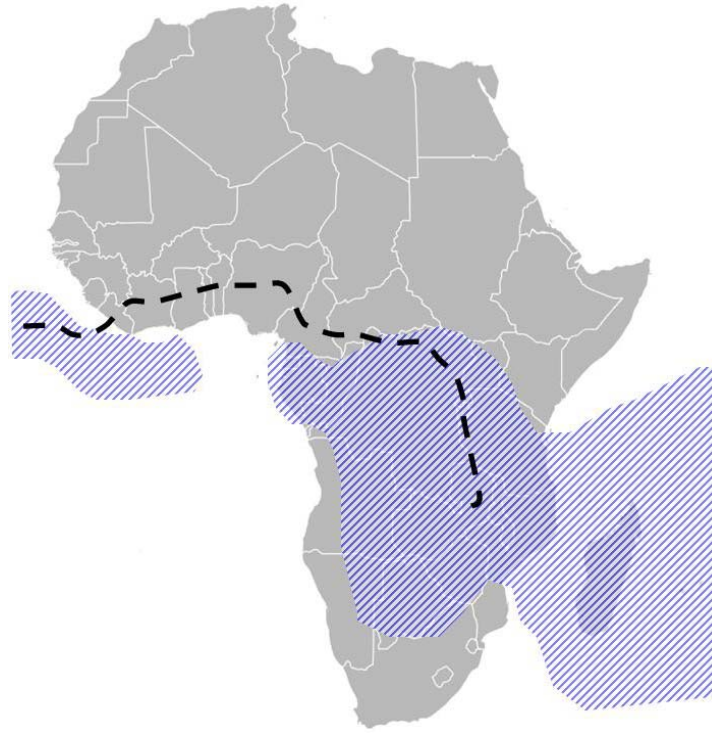
Thus, the seasonal movement of the ITCZ creates a wet and a dry season for most of the countries located in Equatorial Africa. For the majority of countries used in this study, the dry season runs from November through March, with the wet season from April through October, although the change from wet to dry season can vary by as much as a month. For Rwanda and the Democratic Republic of Congo, the wet season has an opposite pattern: October/November through April/May, with a dry season from June through September. Within the wet season, there is typically a 3-4 month period of time where the rainfall is heaviest and most widespread, usually from June through August, although there is some variation from year to year. This period of heaviest rainfall will play an important role in the analysis to follow.

## **THE EFFECT OF THE ITCZ ON INSURGENCIES**

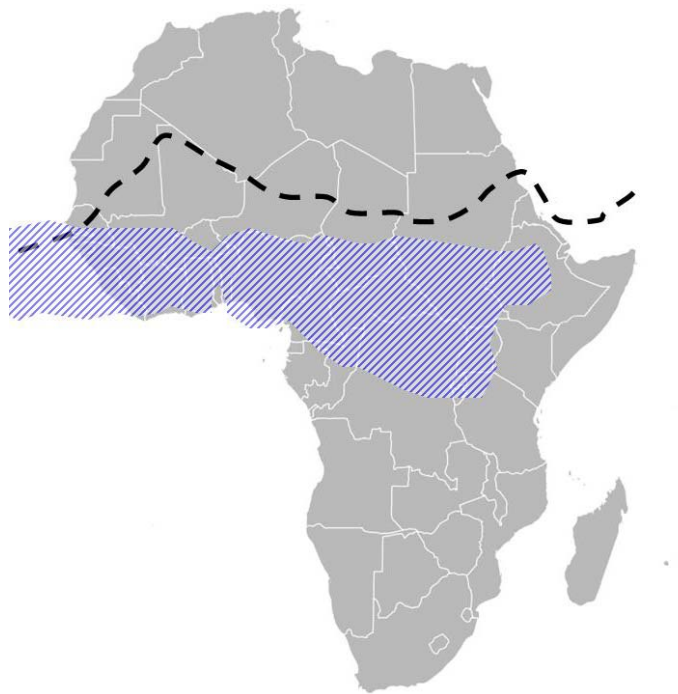
Very little study has been conducted on how insurgencies are affected by climatological factors, to include the effects of the ITCZ. As a key component of the operational factor of space, it is important to understand the effects heavy rains can have on rivers and associated bridges, unimproved roads, and seasonal floodplains, all of which are common features in Equatorial Africa. The use of tanks, armored vehicles, trucks, and jeeps are all but prohibited to a government attempting to conduct COIN during periods of heavy and continuous

---

<sup>2</sup> Ibid., 2-9 to 2-18.



**Figure 2.** Mean January Position of the ITCZ (dashed line) and associated areas of moderate to heavy rainfall (blue shaded areas). From Donahue, et al, 1995.



**Figure 3.** Mean July Position of the ITCZ (dashed line) and associated areas of moderate to heavy rainfall (blue shaded areas). From Donahue, et al, 1995.

rains. Heavy mud can bog down even the most capable vehicle; in the Sudan, the sandy soil, called “Qoz”, becomes waterlogged such that the only viable mode of transportation available is the camel.<sup>3</sup> The continual, widespread rains associated with the ITCZ not only decrease the operational functions of movement and maneuver in which to strike at the enemy; the poor visibility, thunderstorms, and thick, low cloud cover also deny the use of air assets for support, coordination, and attack. As discussed in *Continent Ablaze*, insurgents in the Sudan typically had the advantage during the wet season, due to many roads being submerged, poor ceilings and visibility for flight operations, and concealment for insurgent forces due to lush vegetation.<sup>4</sup> The slackening of government operations also provides opportunities for insurgencies to regroup, rearm, and plan for their next move in relative safety. While the wet season may provide a distinct advantage to small insurgent bands traveling on foot, once an insurgency grows and becomes dependent on the same mode of transportation as the governmental forces, neither side has the advantage.<sup>5</sup>

Furthermore, anecdotal evidence (from the histories that do exist) provides additional support for the argument that rains and inclement weather produced by the ITCZ do in fact affect the ability of government forces conducting operations against an insurgency, particularly in conducting air operations and movement and maneuver on the ground. While not within the time scope of this study, writing on the Nigerian Civil War (1967-1970) stated that, “Except when heavy rains made travel next to impossible, fighting continued throughout 1968 and 1969...”.<sup>6</sup> Even more clear is the link in Sudan; during the Second Sudanese War (1983-2003), the onset of the wet season was a causal factor for the cessation of government operations,

---

<sup>3</sup> Lobban interview, 02 April 2008.

<sup>4</sup> Turner, *Continent Ablaze*, 208.

<sup>5</sup> O’Neill, *Insurgency & Terrorism*, 58.

<sup>6</sup> Edgerton, *Africa’s Armies*, 107.

specifically in 1982: “The onset of the rainy season halted further government attempts to penetrate to the Kenyan and Ugandan borders.”<sup>7</sup> In fact, operations conducted by the Sudanese government against the insurgents were specifically referred to as “dry-season offensives”.<sup>8</sup>

As stated in the introduction, piecing together the detailed histories for each of the insurgencies used in this study was a challenge, in that very little work has been done to create a the day-to-day chronology of the insurgencies. A variety of books and webpages were used to assemble the chronology of each insurgency. Also challenging was attempting to determine exactly when an intensification of an insurgency occurred. An assumption made in this study was that sporadic, low-level fighting took place throughout the years of any given insurgency. Thus it was a challenge to ascertain what constituted periods of intensified fighting, as opposed to the low-level fighting that also took place during any given insurgency. When the literature mentioned government offensives or there were several days/weeks of continuous fighting, this was considered to be a period of intense conflict. Likewise, intense fighting does not equate to the same level of fighting for all insurgencies. Heavy fighting between large governmental and insurgent forces during the Second Sudanese Civil War is not the same as heavy fighting between the smaller governmental and insurgent forces in Guinea-Bissau or Cote d’Ivoire – yet all insurgencies used in this study show periods of intense fighting interspersed with periods of minimal or no fighting, and thus deserve consideration.

## **CASE EXAMPLE COMPARISONS**

In order to visualize the comparison between periods of intense conflict within an insurgency and the onset of the wet season, a series of diagrams have been constructed that show when periods of intense fighting occurred over the course of each year of the insurgency. These

---

<sup>7</sup> Turner, *Continent Ablaze*, 210.

<sup>8</sup> *Ibid.*, 209.

can be found in Appendix A. While some level of fighting may have occurred year-round for the various insurgencies used in this study, only periods of intensified conflict are shown in red.

Also shown on the diagram in gray is the period of heaviest rainfall during the wet season each year. From the diagrams for each case study, a correlation may or may not be discerned.

Ugandan Civil War (1981-1986): See Appendix A. Intense fighting occurred from January through the April/May dry season for 1982 through 1985. However, significant fighting also took place during the wet season during 1982, 1984, and 1985. Heavy fighting was sporadic but present during the fall and winter dry season. Although several years show significant fighting during the most intense period of the wet season, it can be argued that the majority of the fighting did occur during the dry season, from November through March.

Second Sudanese Civil War (1983-2003): See Appendix B. Out of the 21 years of fighting that took place, 14 show intense periods of fighting only during the dry season, or at most one period of intense fighting during the most intense period of the wet season (1983-1990, 1993, 1996, 1999-2001, 2003). The years that do contain intense fighting during the wet season (1991-1992, 1994-1995, 1997-1998, 2002) all occur after the Sudan People's Liberation Army, the main insurgent organization, fractured and underwent intense internecine fighting, in addition to fighting governmental forces.<sup>9</sup> Like the Ugandan Civil War, it can be argued that the majority of intense fighting took place during the dry season, from November to April.

Holy Spirit Movement / Lord's Resistance Army insurgency (1987-present): See Appendix C. In many respects, the Holy Spirit Movement / Lord's Resistance Army insurgency in Uganda was a continuation of their civil war, and thus a similar pattern in the intensity of fighting is seen. No significant fighting took place in 1993, 1998, and 2001, and thus these years are not shown Appendix C. Also, while a peace agreement still has not been reached between

---

<sup>9</sup> Ibid., 210.

the Lord's Resistance Army and the government of Uganda, no significant fighting has taken place in 2006 and 2007, and thus these years are also not shown. Out of the 20 years of this insurgency, 14 years show little to no fighting during the period of greatest rainfall during the wet season (1988, 1990, 1992-1994, 1996-2001, and 2005-2007). The remaining 6 years do show intensified fighting during the heaviest period of rainfall during the wet season, particularly in 1987 and 2002, when Uganda launched massive offensives against the insurgency.<sup>10</sup> The majority of fighting, while sporadic, did take place during the dry season.

First Liberian Civil War (1989-1996): See Appendix D. From the comparison diagrams, it can be seen that significant fighting occurred during both the dry season and wet season for the first 3 years of the war (1990-1992). The next 4 years, from 1993-1996, show an overall decline in the amount of intense fighting; the majority of it occurred during the dry season, from November through May. Of note are the blue lines in 1990-1991, and 1996, indicating U.S. military involvement during this conflict (both NEO). The overall pattern of fighting for this conflict is not as conclusive as that seen in the Sudan or Uganda.

Rwandan Civil War (1990-1994): See Appendix E. In the vicinity of Rwanda, the ITCZ bends southward due to the presence of the Great Rift Valley and Ethiopian highlands to the east; thus the period of Rwanda's heaviest rainfall (November through May) is different from the other countries used in this study. Also different is the pattern of intense fighting in relation to the periods of heaviest rainfall. Unlike the other examples, the pattern that emerges from the comparison diagram shows that the majority of the fighting took place during the period of greatest rainfall, with some intense fighting occurring at the end of the wet season, from April through June/July. This is an excellent example that shows that political and military considerations far outweighed any impacts by poor weather in terms of the timing of when the

---

<sup>10</sup> Conciliation Resources, Northern Uganda: Chronology.

insurgents began their attacks. In this case, both the presidents of Uganda and Rwanda were out of their countries at the time, and thus the Rwandan insurgents, backed by Ugandan forces, took the opportunity to launch an offensive.<sup>11</sup> Note the U.S. military deployment in mid-1994 (NEO).

Sierra Leone Civil War (1991-2002): See Appendix F. In the first year of the war (1991), heavy fighting occurred both during the dry season, as well as throughout the period of heaviest rainfall during the wet season. For the remaining 9 years of the war, the majority of heavy fighting took place during the dry season, from November through May. Note the U.S. military deployments in 1992 and 2000 due to factors related to the insurgency (both NEO).

First Congo War (1996-1997): See Appendix G. Similar to Rwanda, the ITCZ has a different pattern over the Democratic Republic of Congo than that seen over other countries used in this study. Because of its vast size and the significant distance between the northern and southern borders, heavy rainfall occurs throughout the year, as the ITCZ shifts from its northern position in July to its southerly position in January, as depicted on figures 2 and 3. For the Southern Congo basin, where the majority of fighting took place during the First Congo War, the period of heaviest rainfall occurs from October to April. Thus, an examination of the comparison diagram in appendix G shows that the most intense fighting took place during the heaviest period of rainfall during the wet season. This is another example, similar to Rwanda, where political considerations outweighed any effects by the weather, in that the increase in fighting was linked to internal politics and relations between then-Zaire and Rwanda.<sup>12</sup> Note the U.S. military deployments in December, 1996 (support for COIN) and March, 1997 (NEO).

---

<sup>11</sup> Clapham, *African Guerrillas*, 130.

<sup>12</sup> *Ibid.*, 146.



Guinea-Bissau Civil War (1998-1999): See Appendix H. Similar to the pattern seen in the Sierra Leonean Civil War, most of the intense fighting took place in the first year of the war (1998), both during the dry season and during the period of heaviest rainfall during the wet season. However, fighting in 1999 only occurred during the dry season. While noteworthy, the short duration of the war does not allow for a conclusive correlation to be established between the ITCZ and the intensity of conflict. Note the U.S. military deployment in June 1998 (NEO).

Second Liberian Civil War (1999-2003): See Appendix I. With the exception to the fighting in August, 1999, all of the heaviest fighting took place during the dry season, from November through May. This shows a more conclusive pattern than seen during the First Liberian Civil War. Note the U.S. military deployment in June, 2003 (NEO).

Cote d'Ivoire Civil War (2002-2007): See Appendix J. Similar to the pattern seen in the Second Liberian Civil War, all of the heaviest fighting, albeit sporadic, took place during the dry season, from September to March. Note the U.S. military deployment in September, 2002 (NEO).

## **U.S. RESPONSES TO CRISES IN AFRICA (1979-2006)**

Also relevant to this study is a brief analysis of the history of the U.S. military in Equatorial Africa, in response to the insurgencies discussed above. According to a Congressional Research Service Report for Congress from 2007, the U.S. military deployed to Equatorial Africa 15 times between 1979 and 2006, the majority in response to crises precipitated by insurgencies.<sup>13</sup> U.S. military deployments are depicted on the comparison figures in appendices A-J by a thick blue line. Of the 15 deployments, 10 were NEO: Liberia (1990, 1996, 1998, 2003), Sierra Leone (1992, 1997), Rwanda (1994), Democratic Republic of Congo

---

<sup>13</sup> Grimmer, *Instances of Use of United States Armed Forces Abroad*, CRS 18-39.

(1997), Guinea-Bissau (1998), and Cote d'Ivoire (2002). The remaining five deployments were in support of COIN and SO/SO: Democratic Republic of Congo (1991, 1996), Rwanda (1996), Sierra Leone (2000), and Liberia (2003).

From the comparison figures in appendices A-J, it can be seen that the majority of U.S. military deployments to Equatorial Africa coincide with periods of increased fighting between the insurgents and government forces. Also noteworthy is the fact that the majority of U.S. military deployments occur in late spring to early summer, after insurgencies have intensified and created a need for U.S. military intervention. This also corresponds to the end of the dry season and beginning of the wet season, prior to the start of the most intense period of rainfall.

### **III. Analytical Conclusions**

Based on the discussion above, a definite correlation between the seasonal movement of the ITCZ and the intensity of fighting within an insurgency can be established, in that 8 of the 10 insurgencies used in this study showed that the majority of heavy fighting occurred during the dry season, although the strength of this correlation varies. The exceptions to this tendency are the Rwandan Civil War and First Congo War. Additionally, from a historical perspective, it can be seen that the deployment of U.S. military forces in response to crises in Equatorial Africa is linked directly to the increase in intensity of insurgencies, and thus is also linked, albeit indirectly, to the seasonal shifting of the ITCZ.

However, while it is possible to say that the ITCZ plays a role in the relative intensity of fighting within an insurgency, it is impracticable to suggest that the ITCZ was the sole factor in when both the government and the insurgent forces attacked each other. There are many other political, economic, military, and social factors that affected the insurgencies studied. The fact that fighting continued during periods of heavy rainfall shows that the effects of the ITCZ can be

over-ridden by other factors, as shown in the Rwandan Civil War and First Congo War, and to a lesser extent, the initial portions of the Ugandan Civil War, Holy Spirit Movement / Lord's Resistance Army insurgency, First Liberian Civil War, Sierra Leonean Civil War, and Guinea-Bissau Civil War.

Moreover, it is important to note that each insurgency has its own unique set of characteristics. While it is tempting to compare one insurgency to another within the bounds of this study, several key issues must be kept in mind. In most of the insurgencies used in this study, a portion of the fighting took place in urban settings, where roads and bridges are not as vulnerable to heavy rains, and thus ground mobility would not be as hindered by the effects of the ITCZ as fighting taking place in remote areas. Additionally, this study does not discriminate between the scale of the insurgency, in terms of the quantities of troops and types of equipment used by both sides. An example would be the vast difference between the Second Sudanese Civil War, where the Sudanese government used tens of thousands of troops, numerous aircraft, and a wide variety of ground vehicles, and the Guinea-Bissau Civil War, fought by relatively small numbers of troops with relatively the same equipment.<sup>14</sup> Likewise, the length of the insurgency is not used as a discriminator in the findings, as some insurgencies lasted barely two years, whereas several lasted more than a decade. Thus the pattern would be more clearly established in a lengthy insurgency, as opposed to an insurgency that lasted less than a year. Also not included in this study is the Second Congo War due to its multi-national character and use of military force versus military force, vice insurgency.

#### **IV. Recommendations**

---

<sup>14</sup> Turner, *Continent Ablaze*, 210.

Historically, the U.S. military response to crises in Equatorial Africa has been reactive in nature, with little time to plan and assemble adequate forces, much less attempt to de-escalate the situation. As such the answer has been to assemble the forces on hand to alleviate the crisis as quickly as possible, whether it is NEO, COIN, or SO/SO.

Thus the history of U.S. military deployments to Equatorial Africa due to crises caused by insurgencies should be of great interest to military planners. While a pattern exists that does show a correlation between the ITCZ and the intensity of insurgencies, an even stronger pattern emerges when the deployment of U.S. military forces to Equatorial Africa is examined. The causality between crises and the deployment of U.S. military forces is not in itself noteworthy; however, what is most significant is the fact that the majority of deployments to Equatorial Africa between 1979 and 2007 have occurred between April and June. In essence, the repeating pattern is one of heavy fighting during the latter half of the dry season (March through May), which in turn precipitates a crisis which the U.S. military is then tasked to respond to.

While not a guarantee, the linkage between the ITCZ and the intensity of an insurgency, in light of the historical pattern of U.S. military deployments to Equatorial Africa, can be used by military planners at AFRICOM, U.S. Strategic Command, U.S. Joint Forces Command, as well as service components, as a thumb rule for the allocation of forces and for scheduling of exercises within the AFRICOM theater. Similar to the requirement for a 1.0 Carrier Strike Group presence in U.S. Central Command Area of Responsibility, having an Expeditionary Strike Group (or elements thereof) either in the western Mediterranean Sea or within the AFRICOM theater from March to June would position forces closer to a nascent or full-blown crisis. This is already being accomplished, albeit on a smaller scale, by the Africa Partnership Station program. Less provocative would be U.S. military forces already in theater as

participants in bilateral or regional exercises that are specifically scheduled in the March to June timeframe. These exercises could have portions dedicated to NEO, HA/DR, SO/SO, or COIN. Thus, U.S. military forces in theater would already be established and better able to respond to a crisis. A potential side effect to both of these options would be the deterrent effect it might have on insurgent forces either in the process of intensifying the fighting or planning to.

## **V. Final Remarks**

While the scope of this study is rudimentary by necessity, it does show that a definite correlation exists between the seasonal migration of the ITCZ and its effect on the intensity of insurgencies in Equatorial Africa. While the correlation in most cases can be made, particularly in the case of the Sudan where the ITCZ played a casual factor in its second civil war, it is by no means the decisive factor in when insurgencies will experience intensities in fighting. Indeed, many of the examples used in this study showed that heavy fighting took place during the heart of the wet season, during the period of greatest rainfall. Thus it can be seen that other economic, social, military, or political factors can and will override any impacts imposed by the heavy rains associated with the ITCZ and its seasonal migration. A more thorough history of each insurgency that provided a detailed day-by-day chronology of the fighting that took place would help to refine this correlation even further.

Also seen in this study is historical pattern of deployments conducted by the U.S. military in response to the seasonal increase in intensities of previous insurgencies. This linkage between insurgencies, the ITCZ, and U.S. military deployments has the potential to be an extremely useful tool, particularly in AFRICOM, in how the U.S. plans, trains, and executes operations in response to future crises within Equatorial Africa. The U.S. could posture its forces such that its readiness for non-combatant evacuation operations and other missions in a troubled Equatorial

African nation would be greatest during the dry season, particularly between March and June. Once the wet season begins, U.S. military forces could be released for use elsewhere on the globe, vice being tied down in anticipation of operations planned for Equatorial Africa. Likewise, exercises involving the U.S. military with African militaries could be scheduled to occur during the dry season. Not only would this provide excellent training for the U.S. military in operating in dry season conditions, but it would also “stack the deck” in favor of the U.S. in the event that an insurgency elsewhere on the continent flared up, and a U.S. response was required.

Although climatology is typically used as background information for planning, this study has shown that certain aspects of climatology, in this case the ITCZ, can be further exploited to provide greater insight into conflicts and has the potential for giving the U.S. military an edge in how and when it chooses to respond to future crises. With the advent of AFRICOM and in an era of greatly restrained resources, it would be prudent for U.S. military planners to consider all aspects of the operational factor of space, and not just discount climatology as filler in their planning efforts.

## **Bibliography**

Clapham, Christopher, ed. *African Guerrillas*. Oxford, UK: James Currey LTD, 1998.

Conciliation Resources. Liberia: Chronology. <http://www.c-r.org/our-work/accord/liberia/chronology.php> (accessed 05 April 2008).

-----. Sierra Leone: Chronology. <http://www.c-r.org/our-work/accord/sierra-leone/chronology.php> (accessed 05 April 2008).

-----. Sudan: Chronology. <http://www.c-r.org/our-work/accord/sudan/chronology.php> (accessed 05 April 2008).

-----. Northern Uganda: Chronology. <http://www.c-r.org/our-work/accord/northern-uganda/chronology.php> (accessed 05 April 2008).

Davidson, Basil. *The People's Cause: A History of Guerillas in Africa*. Essex, UK: Longman Group Limited, 1981.

Donahue, Christopher A., et al. *Equatorial Africa: A Climatological Study*. USAFETAC/TN-95/001, USAF Environmental Technical Applications Center, 1995.

Dorsey, Learthen. *Historical Dictionary of Rwanda*. Metuchen, NJ: The Scarecrow Press Inc., 1994.

Edge, Wayne. *Global Studies: Africa*. 11th ed. Dubuque, IA: McGraw-Hill/Dushkin, 2006.

Edgerton, Robert B. *Africa's Armies: From Honor to Infamy*. Boulder, CO: Westview Press, 2002.

Fyle, Magbaily C. *Historical Dictionary of Sierra Leone*. Lanham, MD: The Scarecrow Press Inc., 2006.

Grimmett, Richard F. *Instances of Use of United States Armed Forces Abroad, 1798-2006*. Washington, D.C.: Congressional Research Service, January 2007.

Lecomte, Douglas. Meteorologist, National Oceanographic and Atmospheric Administration. Data table, "Progress of Seasonal Rains in West Africa, Ten-Day Average Intertropical Front Position", 1979-2000.

-----. Meteorologist, National Oceanographic and Atmospheric Administration. Data table, "Ten-Day Average Intertropical Disturbance, Longitude 15 Degrees West to 35 Degrees East", 1988-2007.

Lobban, Richard A. Jr., Robert S. Kramer, Carolyn Fluehr-Lobban, *Historical Dictionary of The Sudan*. Lanham, MD: The Scarecrow Press Inc., 2002.

O'Neill, Bard E. *Insurgency & Terrorism: Inside Modern Revolutionary Warfare*. McClean, VA: Brassey's (US) Inc., 1990.

Osanka, Franklin M., ed. *Modern Guerrilla Warfare: Fighting Communist Guerrilla Movements, 1941-1961*. New York, NY: Free Press of Glencoe, 1962.

Professor Richard A. Lobban (Chair of Anthropology Department, Rhode Island College), interview by author, 02 April 2008.

Timelines of History. Democratic Republic of Congo.

<http://timelines.ws/countries/CONGO.HTML> (accessed 06 April 2008).

-----. Ivory Coast. <http://timelines.ws/countries/IVORYCOAST.HTML> (accessed 06 April 2008).

-----. Guinea-Bissau. [http://timelines.ws/countries/GUINEA\\_BISSAU.HTML](http://timelines.ws/countries/GUINEA_BISSAU.HTML) (accessed 06 April 2008).

-----. Liberia. <http://timelines.ws/countries/LIBERIA.HTML> (accessed 06 April 2008).

-----. Rwanda. <http://timelines.ws/countries/RWANDA.HTML> (accessed 06 April 2008).

-----. Sierra Leone. <http://timelines.ws/countries/SIERLEON.HTML> (accessed 06 April 2008)

-----. Sudan. <http://timelines.ws/countries/SUDAN.HTML> (accessed 06 April 2008).

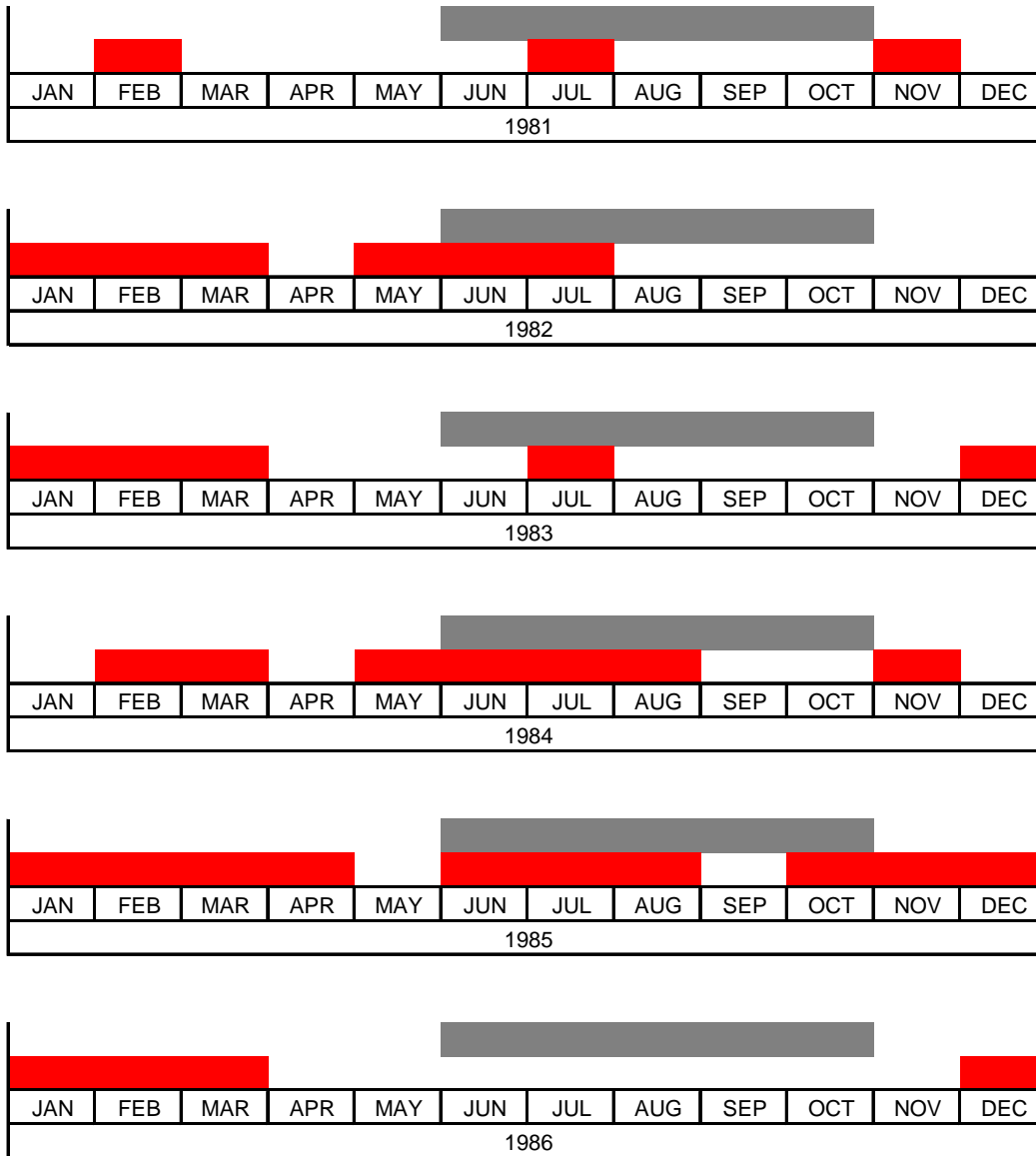
-----. Uganda. <http://timelines.ws/countries/UGANDA.HTML> (accessed 06 April 2008).

Turner, John W. *Continent Ablaze: The Insurgency Wars in Africa, 1960 to the Present*. London, UK: Arms and Armour Press, 1998.



## Appendix A

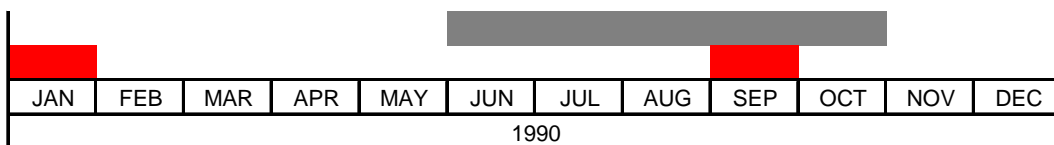
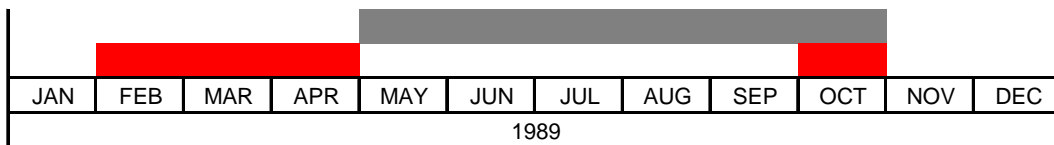
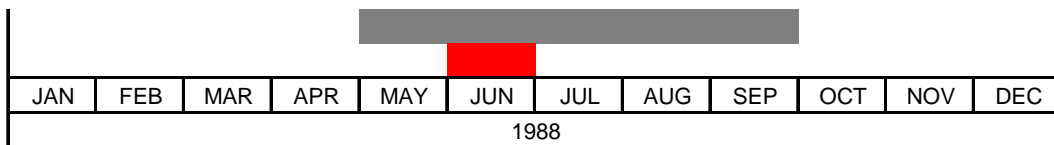
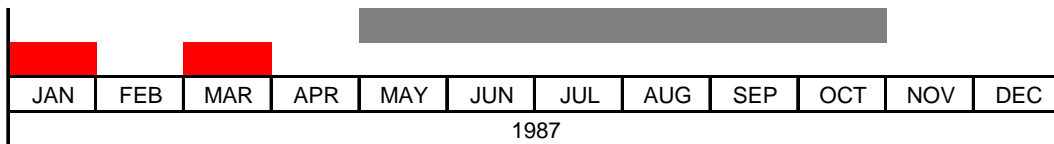
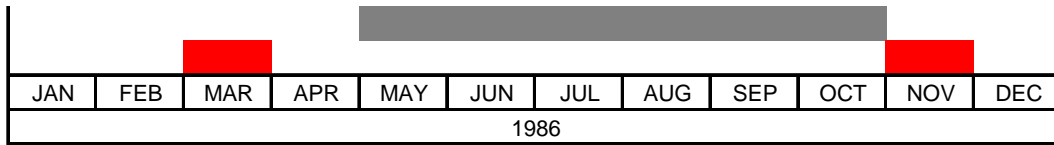
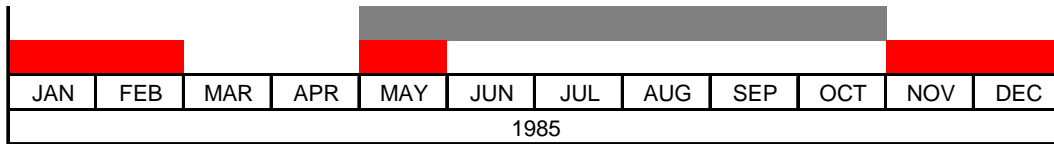
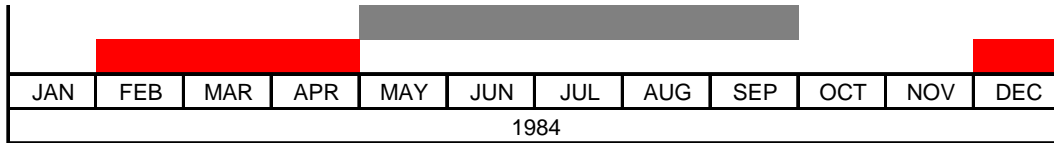
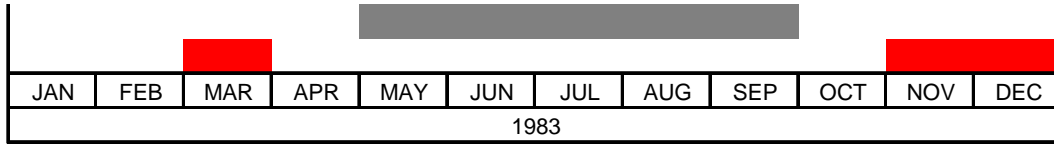
### Ugandan Civil War (1981-1986)



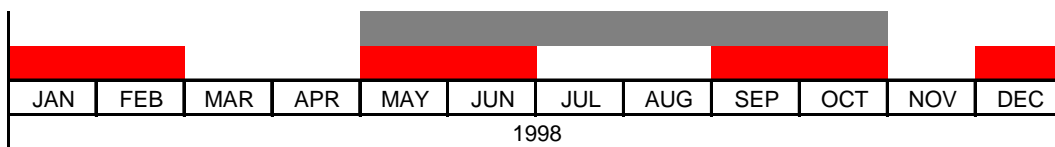
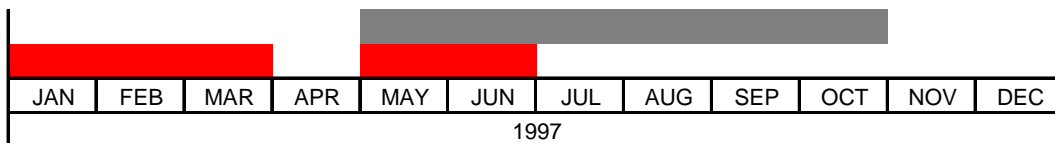
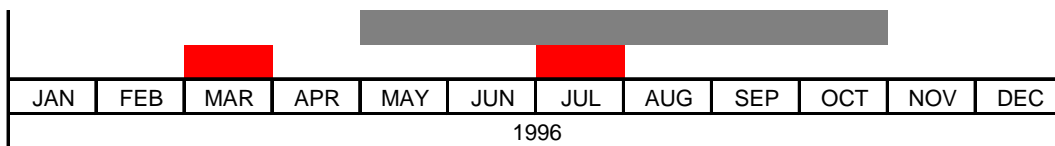
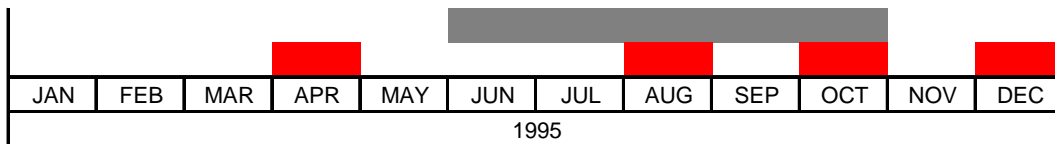
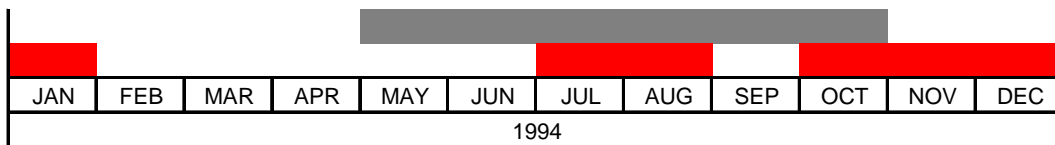
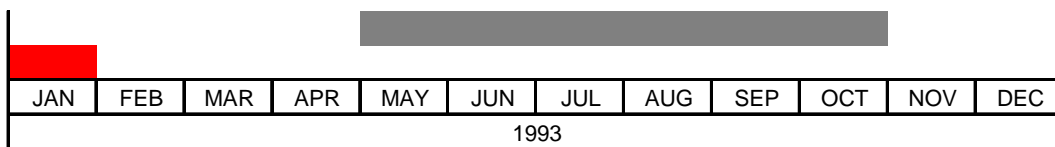
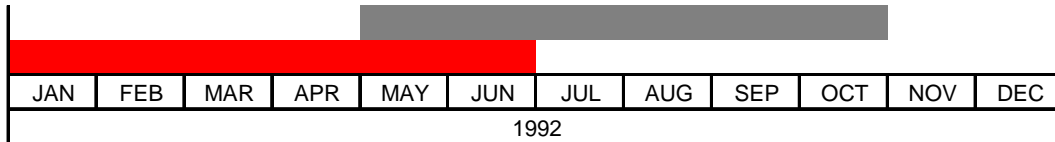
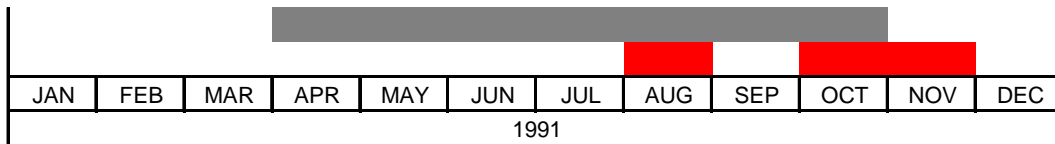
**Comparison diagram for the Ugandan Civil War (1981-1986).** The red segments denote intensified conflict; the gray segments denote the period of heaviest rains during the wet season.

## Appendix B

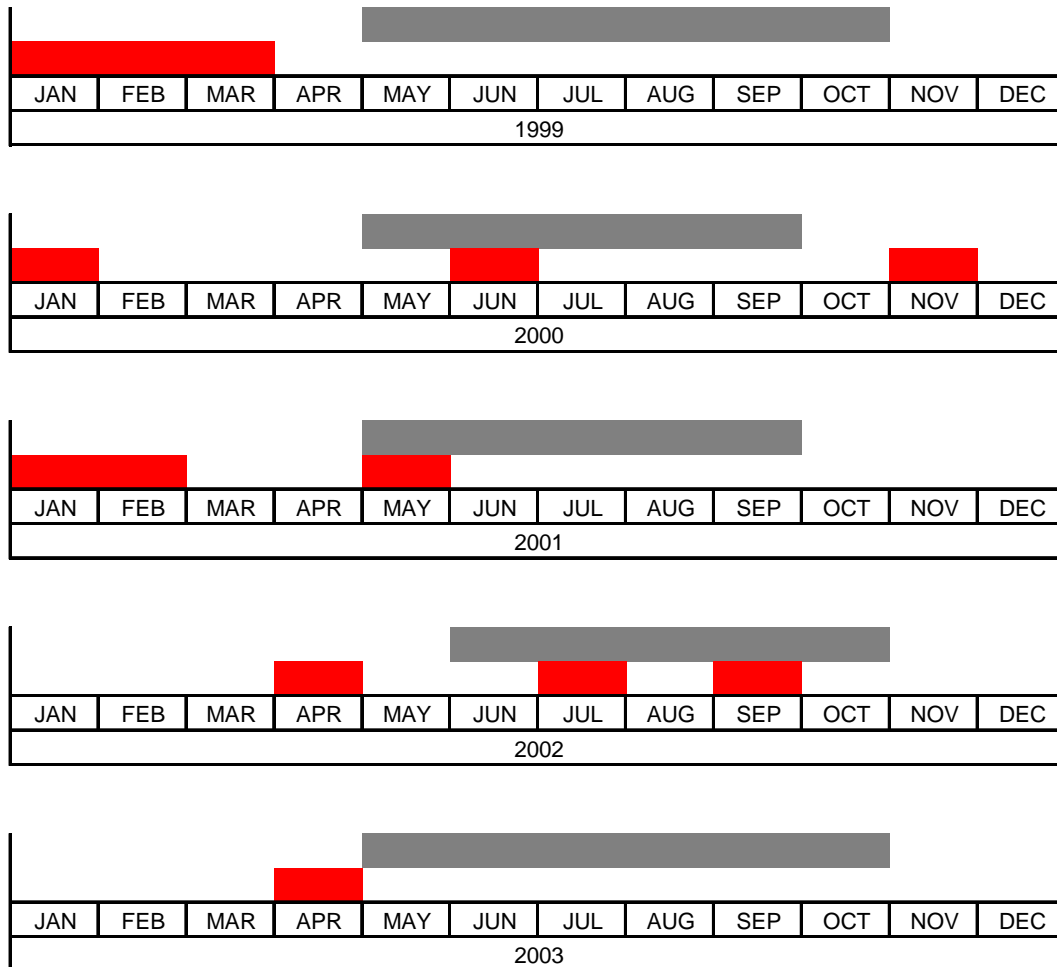
### Second Sudanese Civil War (1983-2003)



## Second Sudanese Civil War (1983-2003)



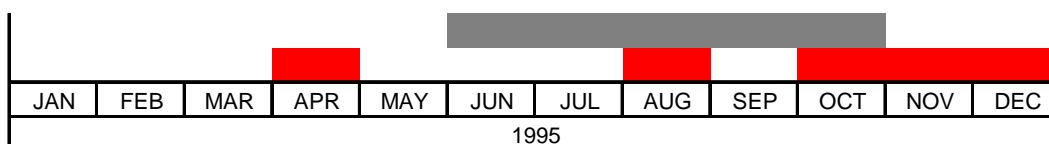
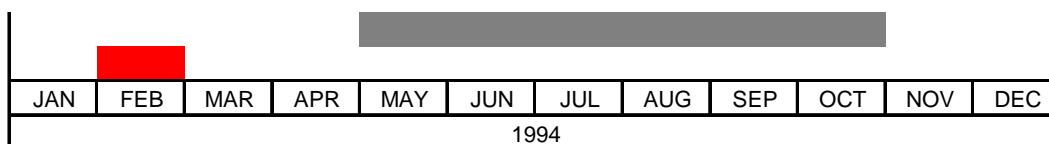
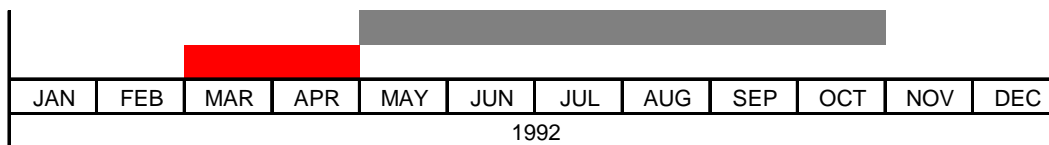
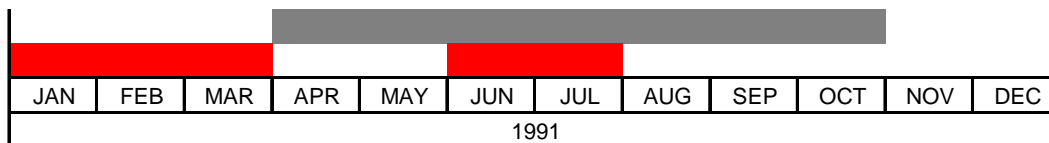
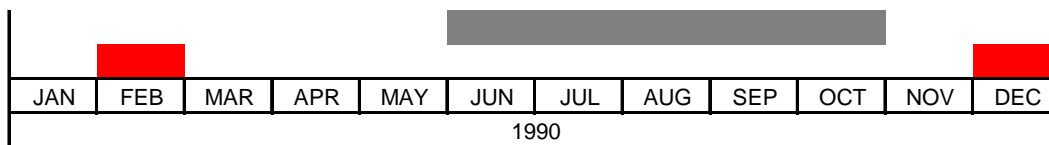
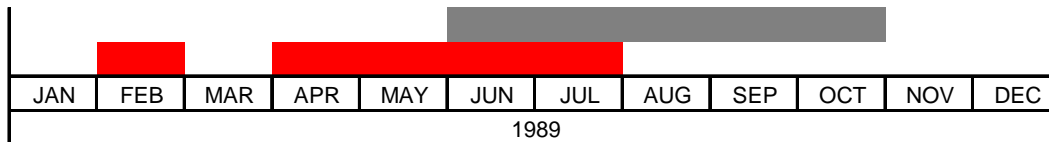
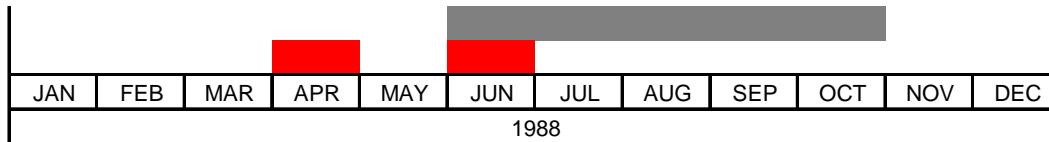
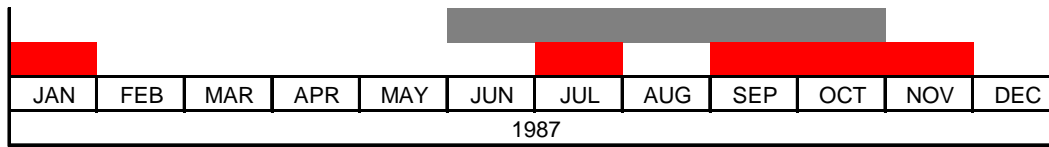
### Second Sudanese Civil War (1983-2003)



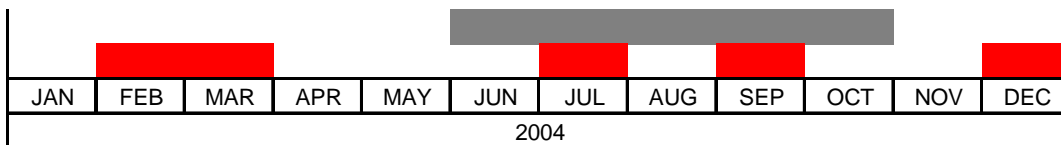
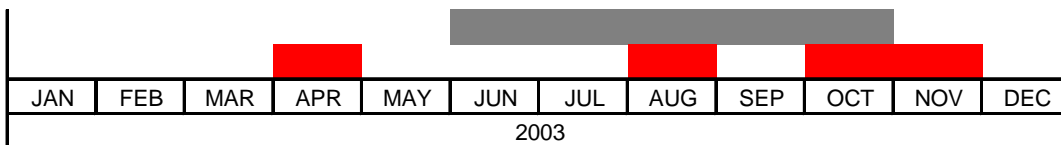
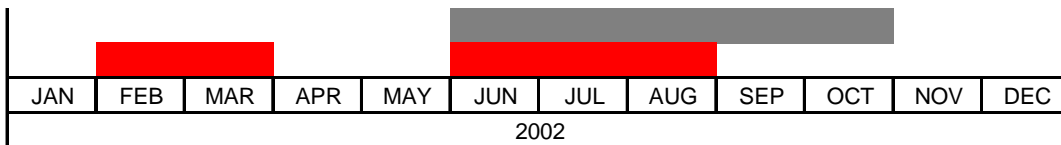
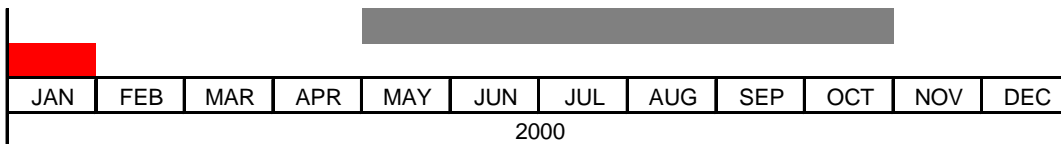
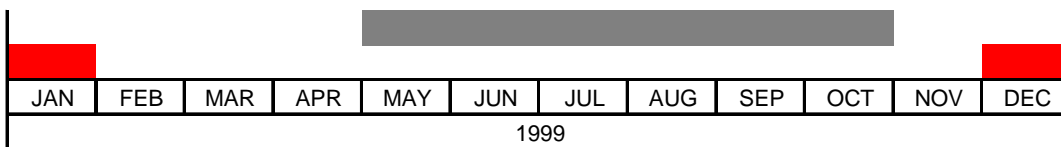
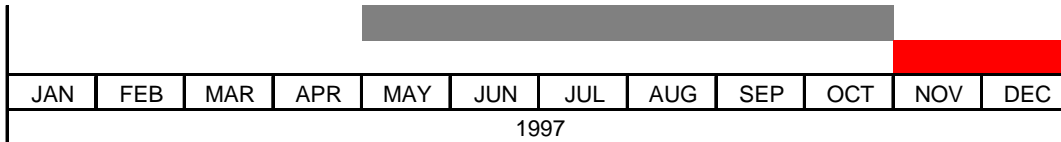
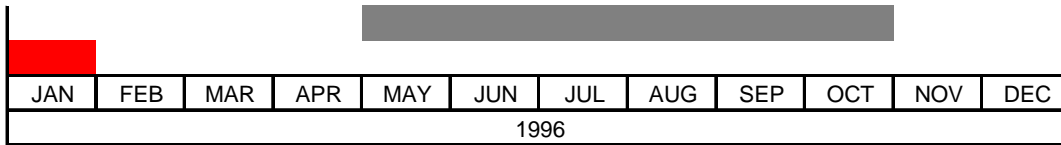
**Comparison diagram for the Second Sudanese Civil War (1983-2003).** The red segments denote intensified conflict; the gray segments denote the period of heaviest rains during the wet season.

## Appendix C

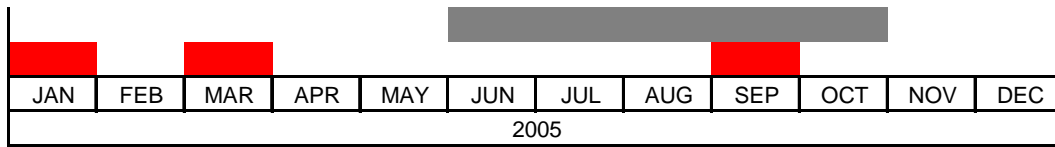
### Holy Spirit Movement / Lord's Resistance Army insurgency (1987-present)



### Holy Spirit Movement / Lord's Resistance Army insurgency (1987-present)



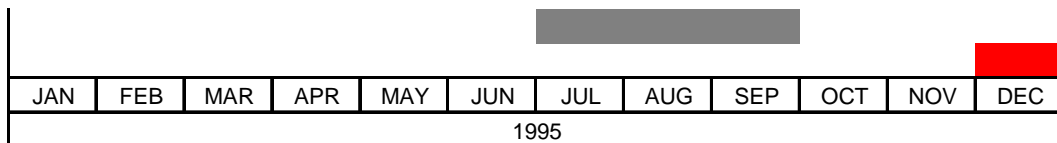
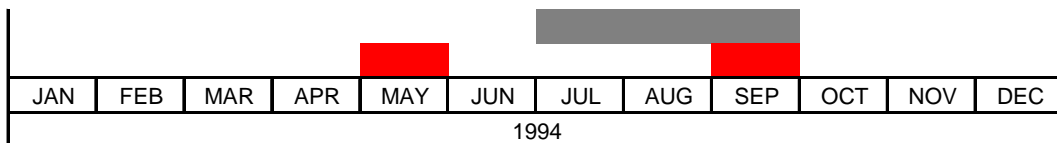
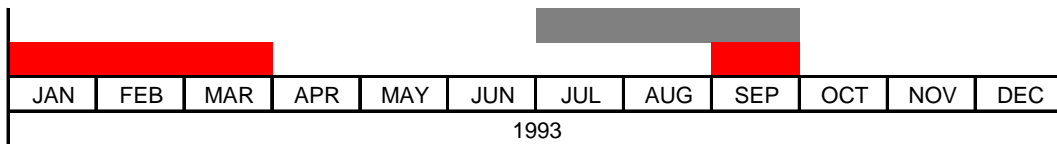
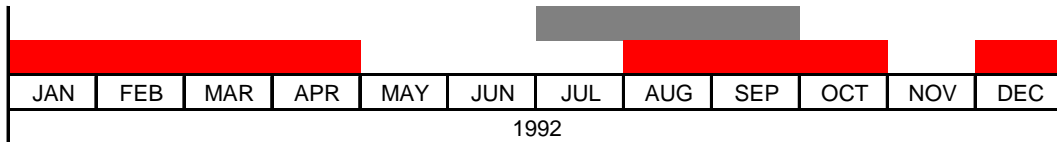
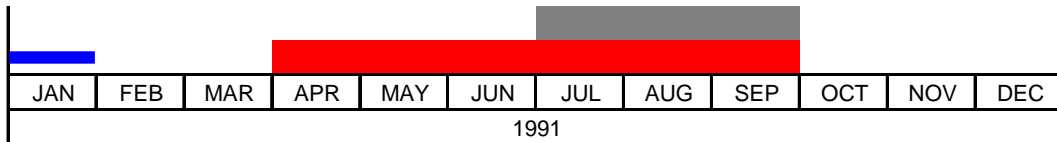
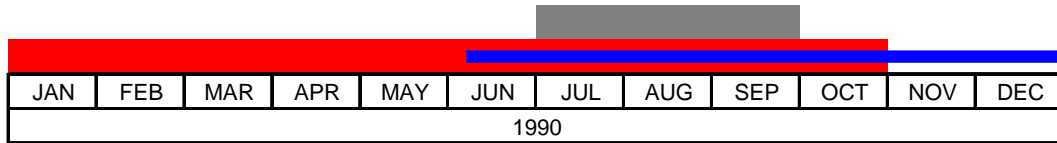
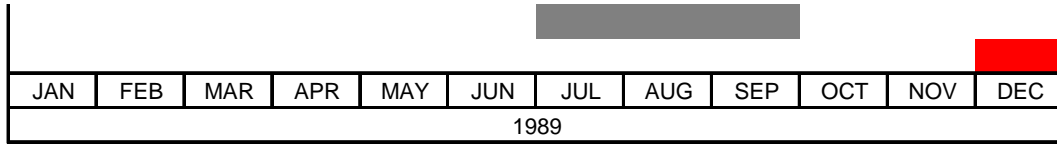
### Holy Spirit Movement / Lord's Resistance Army insurgency (1987-present)



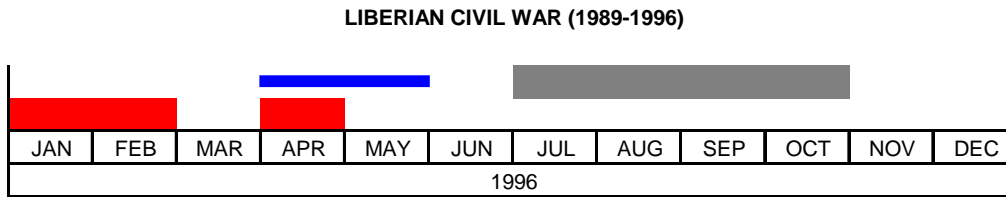
**Comparison diagram for the Holy Spirit Movement / Lord's Resistance Army insurgency in Uganda (1987-2005).** The red segments denote intensified conflict; the gray segments denote the period of heaviest rains during the wet season.

## Appendix D

### LIBERIAN CIVIL WAR (1989-1996)



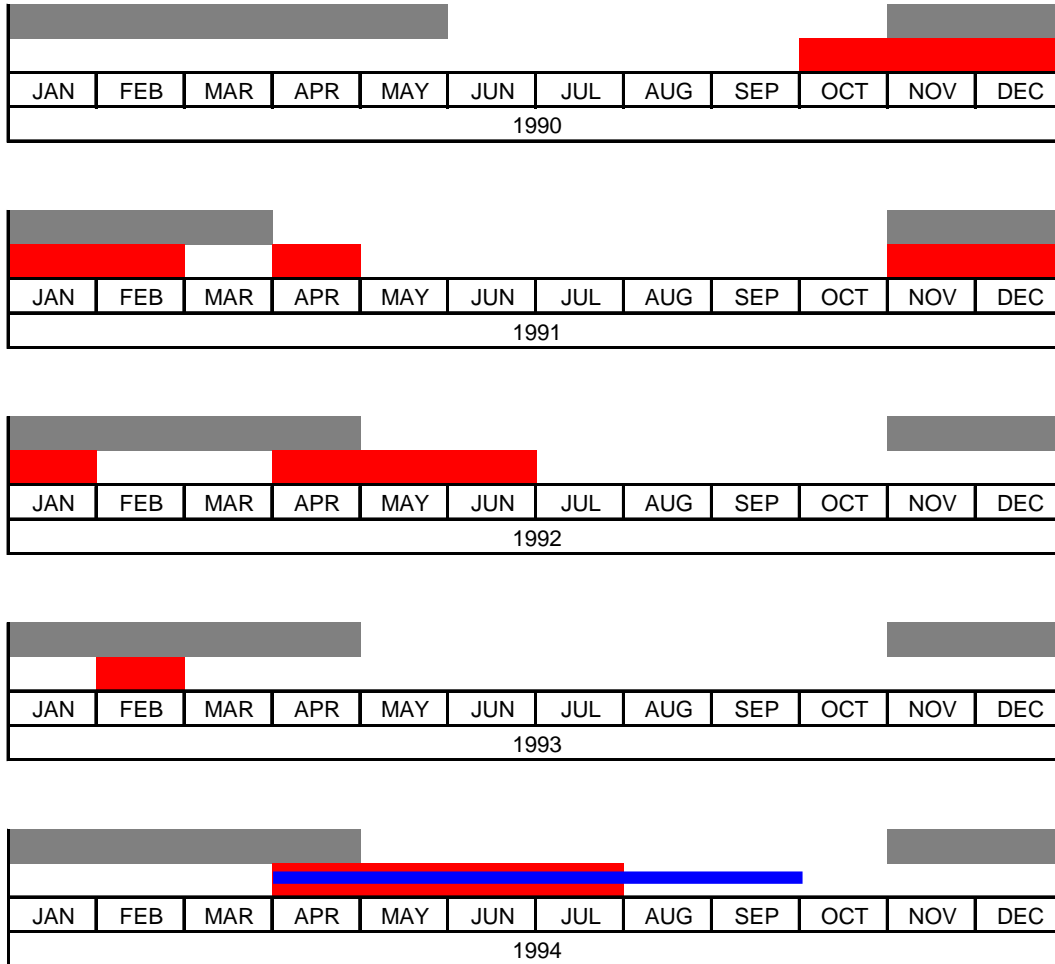




**Comparison diagram for the First Liberian Civil War (1989-1996).** The red segments denote intensified conflict; the gray segments denote the period of heaviest rains during the wet season. The blue lines indicate U.S. military deployments related to the insurgency.

## Appendix E

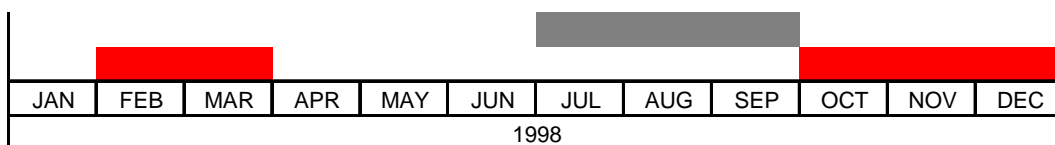
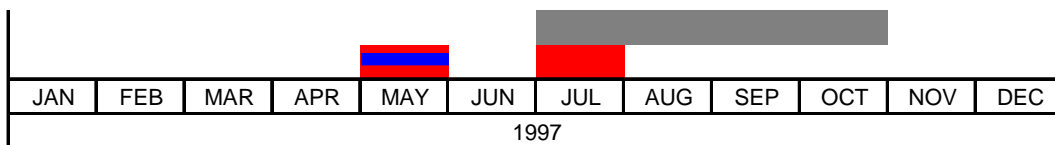
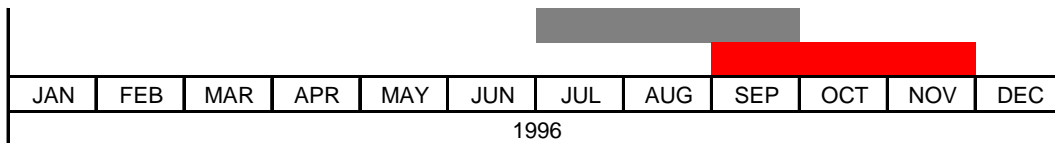
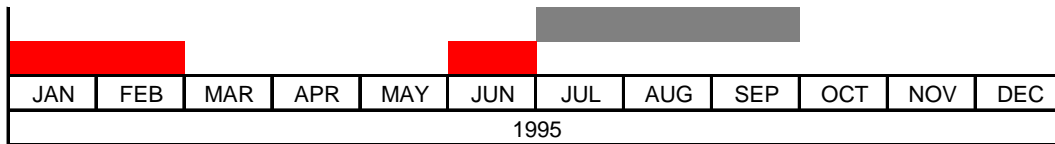
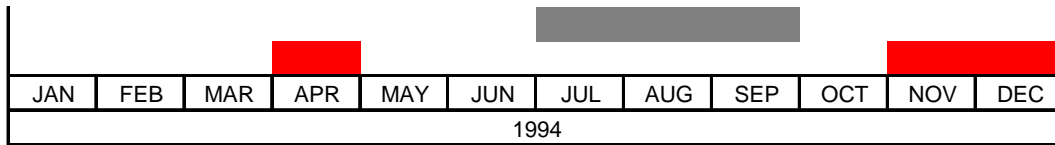
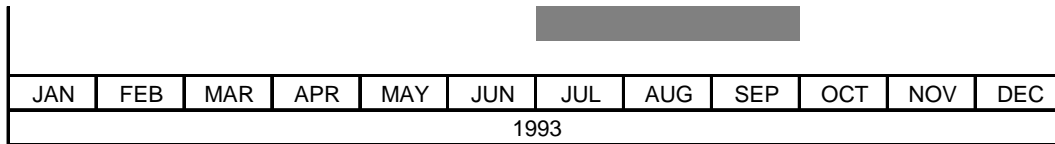
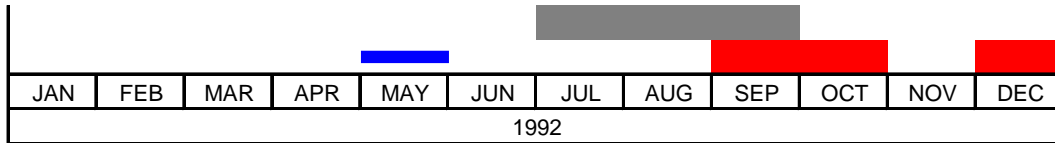
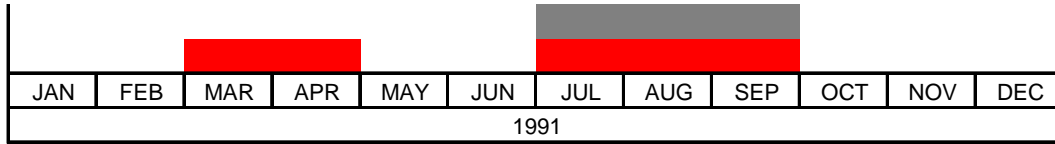
### Rwandan Civil War (1990-1994)



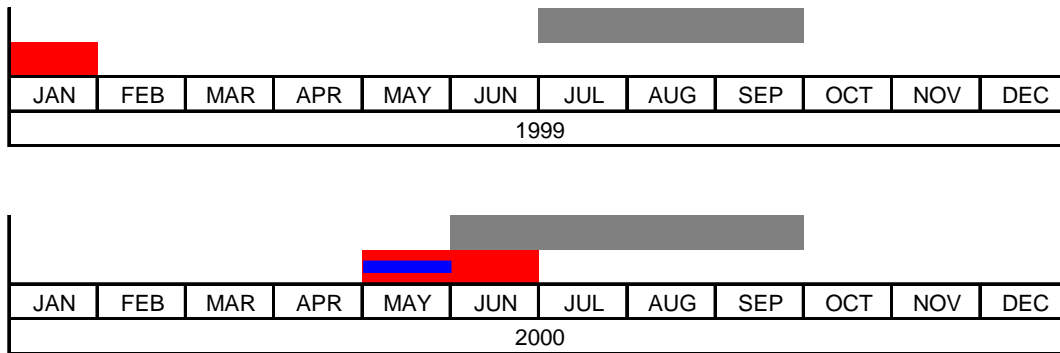
**Comparison diagram for the Rwandan Civil War (1990-1994).** The red segments denote intensified conflict; the gray segments denote the period of heaviest rains during the wet season. The blue lines indicate U.S. military deployments related to the insurgency.

## Appendix F

### Sierra Leonean Civil War (1991-2000)



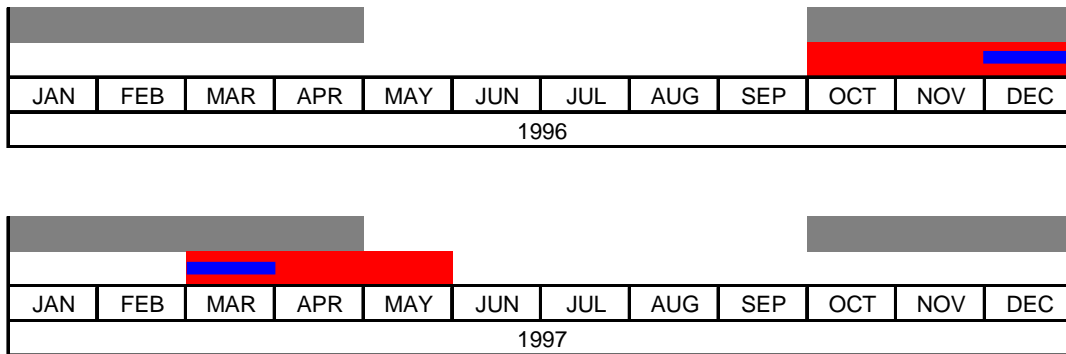
### Sierra Leonean Civil War (1991-2000)



**Comparison diagram for the Sierra Leonean Civil War (1991-2000).** The red segments denote intensified conflict; the gray segments denote the period of heaviest rains during the wet season. The blue lines indicate U.S. military deployments related to the insurgency.

## Appendix G

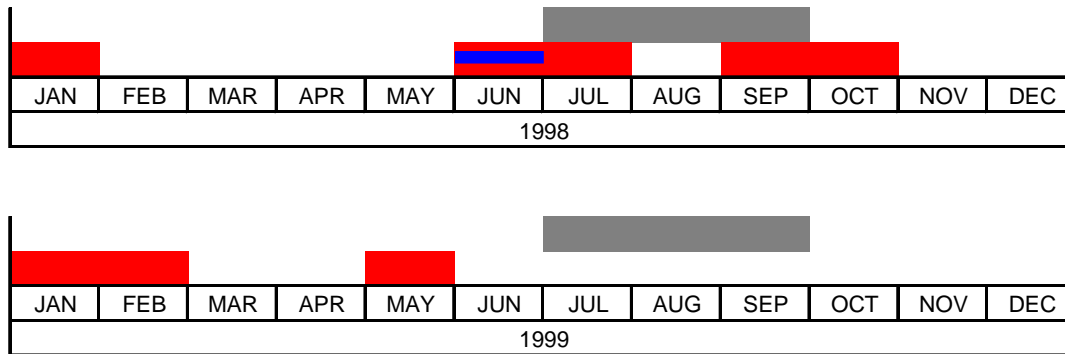
### First Congo War (1996-1997)



**Comparison diagram for the First Congo War (1996-1997).** The red segments denote intensified conflict; the gray segments denote the period of heaviest rains during the wet season. The blue lines indicate U.S. military deployments related to the insurgency.

## Appendix H

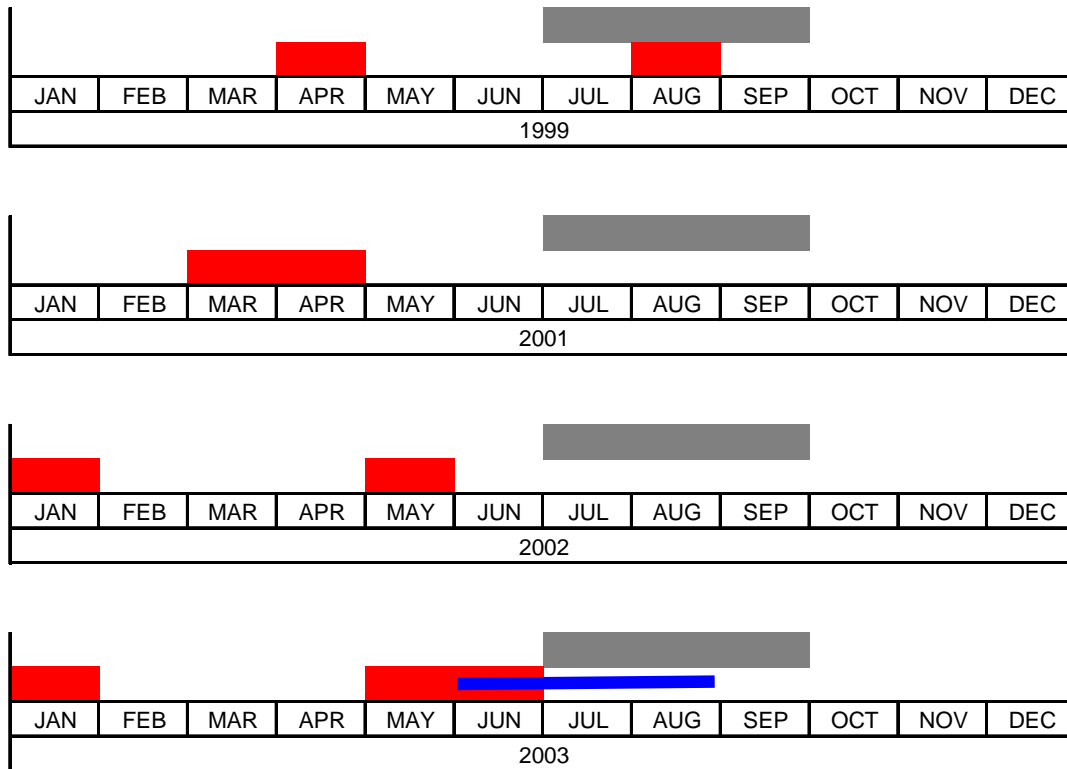
### Guinea-Bissau Civil War (1998-1999)



**Comparison diagram for the Guinea-Bissau Civil War (1998-1999).** The red segments denote intensified conflict; the gray segments denote the period of heaviest rains during the wet season. The blue line indicates a U.S. military deployment related to the insurgency.

## Appendix I

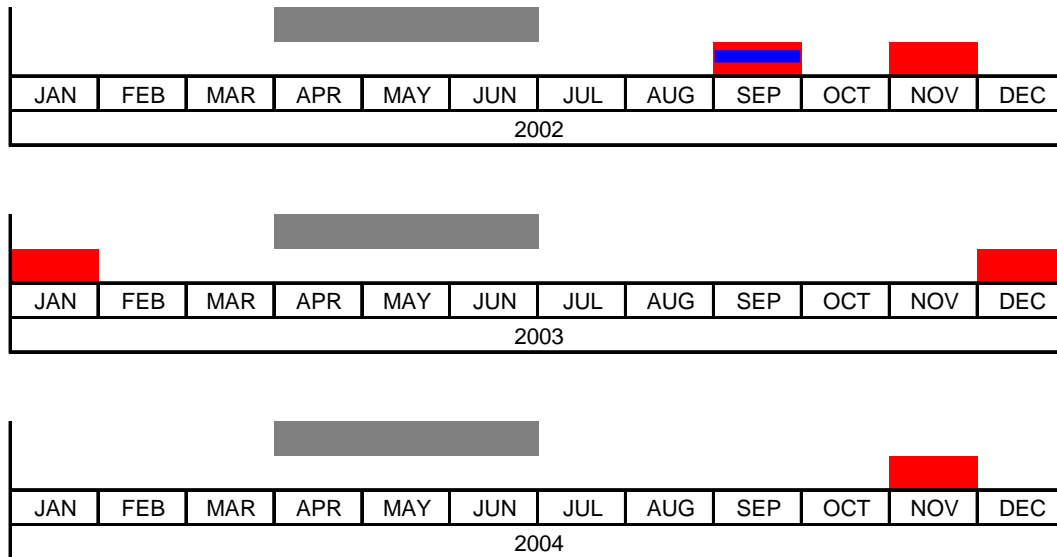
### Second Liberian Civil War (1999-2003)



**Comparison diagram for the Second Liberian Civil War (1999-2003).** The red segments denote intensified conflict; the gray segments denote the period of heaviest rains during the wet season. The blue line indicates a U.S. military deployment related to the insurgency.

## Appendix J

### Cote d'Ivoire Civil War (2002-2007)



**Comparison diagram for the Cote d'Ivoire Civil War (2002-2007).** The red segments denote intensified conflict; the gray segments denote the period of heaviest rains during the wet season. The blue line indicates a U.S. military deployment related to the insurgency.